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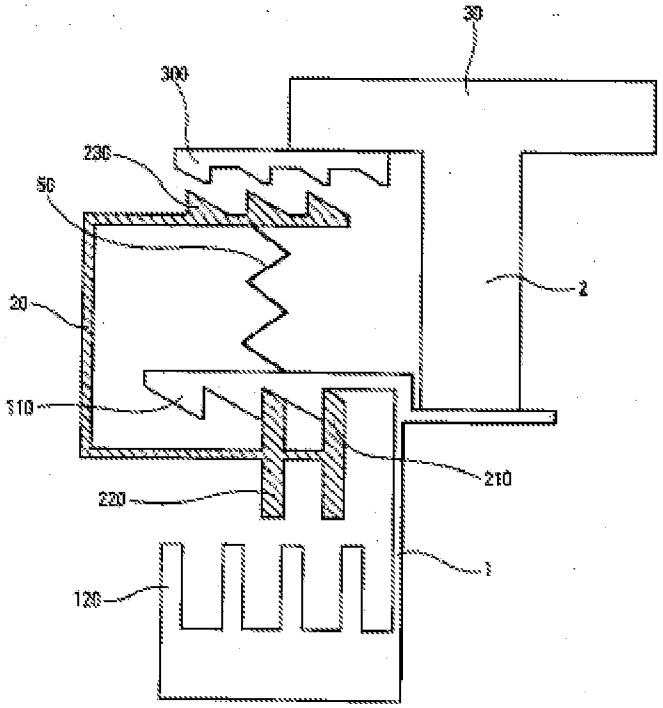
Summary

A fluid distributor comprising a body (1), a reservoir (2), a distribution device such as a pump or a valve, mounted on the said reservoir (2) and a dose indicating device to display the number of doses of product dispensed or left to be dispensed from the said reservoir characterized by the fact that the said dose indicating device comprises a first security system designed to activate the dose indicating device from a predetermined partial displacement of the distributor even if the complete activating displacement is not achieved by the distributor.



The present invention relates to fluid materials distributor, and in particular one equipped with a device that indicates doses to help the user keep track of the number of doses used or remaining in the reservoir of the said distributor of fluids.

The dose indicating devices are well known and can comprise either counters, displaying digits corresponding to the number of dose dispensed or still left to be dispensed, or indicators that inform the user by symbols, coded colors or similar digits about the number of doses dispensed or left to be dispensed. In particular in the case of fluid distributors used for pharmaceutical formulations, it is important that the dose tracking device functions in a very reliable fashion and that it counts a dose each time the product is dispensed regardless of if the dose was complete or not, such as the case of a mal-function or interruption before the end of an activation cycle. As a matter of fact, it is generally preferable to count an incomplete dose rather than not count it which can put the user at risk by giving the wrong information about the remaining content of the reservoir of the distributor. In distributors designed for pharmaceutical products, one wishes in general to avoid any risk of under-counting, by particularly counting just counting just before the dispensing of the active product. Another important point related to the dose indicator in pharmaceutical products distributors, is that after activation and dispensing of a dose, and while the device is returning to its resting position, any other activation taking place before the final rest resulting in dispensing of a partial or complete dose should be counted by the dose tracking mechanism to avoid the possibility of under-counting. In the majority of fluid materials distributors, after dispensing a dose, the next dose is loaded in the holding chamber of the distributor (pump or valve) during the return displacement of the distributor to its rest position. To avoid any risk of under-counting, during the return trip of the distributor, it is preferable that the fluids distributor is blocked starting from the time when the return displacement permits the refill of the holding chamber to the time when the dose tracking mechanism is again capable of counting the activation of the distributor.

The present invention intends to provide a fluid materials distributor that fulfills the following requirements.

In particular the present invention intends to provide a fluid materials distributor comprising a dose tracking device that eliminates any risk of under-counting, in other

words one that guaranties the activation of the dose tracking device each time the fluid product is dispensed by the distributor.

The present invention also intends to provide such distributor that eliminates the possibility of counting of a dose thus activating the dose tracking mechanism when no fluid material has been dispensed.

The present invention also intends to provide such distributor that is simple and low cost to manufacture and assemble and reliable.

The present invention has thus for object, a fluid material distributor comprising a body, a reservoir for fluids, a distributing device, such as a pump or a valve, mounted on the said reservoir, and a dose tracking device (dose indicator), that displays the number of dose dispensed from the reservoir or number of doses left in the reservoir, characterized by the fact that the said dose tracking device comprises a first security system designed to activate the dose tracking device from a pre-determined partial activating motion of the distributor, even if the complete activating motion is not achieved by the distributor.

Preferably, the said dose tracking device comprises a second security system that during the return displacement of the distributor, after dispensing a dose, prevents the next dispensing of the pharmaceutical product until the said distributor accomplishes a pre-determined partial return displacement, said distributor and said dose tracking device being capable of being activated again by this pre-determined partial return displacement, even if the complete return displacement is not achieved by the distributor and that the latter is activated again before going back to its resting position.

Advantageously, the said reservoir is axially movable with respect to the body, said body comprises at least a fixed gear, said device of dose counting comprises an element axially movable and in rotation with respect to the said body, said counting device cooperating with on one hand the said fixed gear of the body and on the other with the said reservoir when the distributor is activated.

According a first mode of practice of the invention, the said body comprises a fixed gear cooperating with a first gear of the said counting element, said counting element comprising a second gear cooperating with an activating gear of an activating organ of the distributor, the teeth of the said second gear and/or said activation gear being made such that an axial displacement of the activating organ forces the said counting

element to displacement axially and in rotation, said fixed gear preventing the rotation of the said counting element until the said counting element no longer cooperates with the said fixed gear, after a predetermined axial displacement of the said counting element corresponding to the said partial predetermined activating displacement of the distributor.

Advantageously, the fixed gear comprises stopping means that block the rotation of the said counting element after at least a partial rotation of the said counting element, an additional axial displacement of the said counting element being necessary to enable the pursuit of its rotation and/or the return of the dose indicator device to its resting position. These stopping means position the second gear of the counting element such that the distributor is blocked in its return before the filling of the chamber and until it comes to rest.

Advantageously, the said means of stopping comprise an axial projection.

Advantageously, the said fixed gear and/or said counting element comprise blocking means that prevent a new activation of the distributor and thus a new dispensing of pharmaceutical product when the counting element is returning back to its resting position after an activation until the distributor achieves a predetermined partial displacement from which the dose indicator can start counting the next dose.

Advantageously, the said stopping means comprise axial projections mounted respectively on the body and the counting element, said projections comprise each a profile with fixed axial end, said projections being at least opposite each other until the counting element achieves a rotation sufficient to shift the said projections corresponding to the said partial return displacement of the distributor.

Advantageously, the teeth of the second gear of the counting element comprise an intermediate landing with which the activating device cooperates during the activation of the distributor, said landing cooperates with the bottom of the said second gear during the return to the resting position after activation, said displacement between the intermediate landing and the bottom is obtained by rotation of the said counting element.

Advantageously, when the pre-determined partial return displacement is accomplished, the activating device is placed opposite the next tooth of the second gear of the counting element, enabling a second activation of the distributor and the dose indicating device.

According to a second mode of practice of the present invention, the said body comprises a first stationary gear and a second stationary gear, said counting element comprising a first gear designed to cooperate with the said first stationary gear and a second gear designed to cooperate with the said second stationary gear, said counting element being axially held in contact with the activating device of the distributor by the intermediary of a return spring and being rotationally movable with respect to the said activating device, the teeth of the said second gear and second stationary gear being at least partially oblique such that an axial displacement of the activating device forces first the said counting element to move axially in a predetermined partial activating displacement until the oblique part of the said second gear of the counting element cooperates with said oblique part of the said second stationary gear, forcing the counting element to move in rotation on a first part of a rotation cycle, the teeth of the said first gear and first stationary gear being at least partially oblique such that when the counting element returns to its resting position it is forced to finish its rotation cycle corresponding to the counting of an activation of the distributor.

Advantageously, the said first and second stationary gears of the body and/or the said first and second gears of the counting element are shifted with respect to each other such that just when the counting element rotates a return of the latter to its resting position without finishing the activating run of the distributor triggers the complete rotation cycle of the counting element guaranteeing the counting of an activation of the distributor after the said partial predetermined activation displacement.

Advantageously, the second stationary gear of the body and/or the said second gear of the counting element comprise blocking means preventing, a new activation of the distributor and thus a new dispensing of the pharmaceutical product when the counting element returns to its resting position after the last activation, until the said distributor accomplishes a predetermined partial displacement from which the counting device can count the next dose.

Advantageously, the said blocking means comprise a profile with an axial end that is at least partially plane disposed on the teeth of the said second stationary gear of the counting element, said plane profiles of the said teeth being at least partially opposite each other until the counting element accomplishes a rotation sufficient to shift the said

teeth corresponding to the said return partial predetermined displacement of the distributor.

Advantageously, the said activating device of the distributor is attached to the said reservoir and moves axially with the latter.

According to a third mode of practice of the present invention, the said body comprises a first stationary gear and a second stationary gear, said counting element comprising a first gear designed to cooperate with the said stationary first gear , a second gear designed to cooperate with the said stationary second gear, and a third gear designed to cooperate with an activation gear attached to an activating device of the distributor, the teeth of the said third gear and/or activating gear being made such that an axial displacement of the activating device forces the said counting element to move axially and in rotation , said first gear preventing the rotation of the said counting element until the said counting element no longer cooperates with the said first stationary gear, after the partial predetermined axial displacement of the said counting element corresponding to the said predetermined partial activating displacement of the distributor.

Advantageously, the said second stationary gear of the body and/or the second gear of the counting element comprises blocking means preventing a new activation f the distributor and thus a new dispensing of the pharmaceutical product when the counting element returns to its resting position after a last activation until the said distributor accomplishes a return predetermined partial displacement from which the dose indicating device can count the next dose.

Advantageously, the said blocking means comprise a profile with a plane axial end disposed on the teeth of the said stationary second gear and said second gear, said teeth being at least partially opposite each other until the said counting element accomplishes a rotation sufficient to shift the said teeth, corresponding to the said predetermined partial return displacement of the distributor.

Advantageously, the said activating gear comprises blocking means limiting the rotation of the counting element until the activating device accomplishes the said predetermined partial return displacement.

Advantageously, the said blocking means comprise an axial projection disposed on the said activating gear.

Advantageously, the said activating device of the distributor is attached to the said reservoir and move axially wit it.

Other characteristics and advantages of the present invention will appear more clearly during the following detailed description of the three modes of practice of the latter, with reference to the attached drawings given here as non limiting examples and in which:

- Figures 1 to 8 are schematic representations of a fluid products distributor according to a first mode of practice of the invention, showing the successive positions during an activation cycle of the distributor.

- Figures 9 to 12 are schematic representations of a fluid products distributor according to a second mode of practice of the present invention showing also diverse positions during the activation cycle of the distributor and

- Figures 13 to 21 are schematic representations of a fluid products distributor according to a third mode of practice of the current invention, showing different position during the activation cycle of the distributor.

The descriptions of the three modes of practice of the current invention that will follow relates to the activation cycles of the distributor and the different functional specificities of the dose indicating device guaranteeing the reliability of the functioning and counting of the said dose indicating device. The drawings to which the current description refers are thus simplified schematics that do not represent a detailed description of the distributor of fluid materials but only schematics of the different moving parts with respect to each other to facilitate the explanation of the activation cycle of the said distributor and said dose indicating device. In This manner for instance, the distribution device, such as a pump or a valve, is not represented on the drawings. Also, the distribution head comprising the distributing orifice is not represented either, these elements not being directly involved in the current invention.

It should be noted that the present invention applies in particular to devices called MDI (Metered Dose Inhaler), that comprise a dosing valve mounted on top of a reservoir containing the fluid product and a pressurizing gas, the displacement of the reservoir with respect to the valve leads to the dispensing of a dose of the product by the said

pressurizing gas. The present invention is not limited to this particular application but the latter represents the preferred application of the present invention.

In reference to figures 1 to 8, we are going to describe a first mode of application of the present invention. According to this mode of practice, the distributor comprises a reservoir 2 movable axially in a body 1, which will be considered as the stationary part of the distributor. The axial displacement of the reservoir 2 with respect to the body 1 activates the distribution device and thus achieves the distribution of a dose of the product from the reservoir. According to this first mode of practice of the current invention, the distributor comprises an activating device 30 to which the user applies an activating axial force to achieve an activation of the distributor and thus a displacement of the said reservoir 2 with respect to the body 1. The distributor comprise also a dose indicating device designed to count or indicate, after each activation of the distributor, the dispensing of a dose of the fluid product. The user can thus with the help of this dos indicating device know how many dose have been dispensed from the reservoir 2 or how many doses remain in the said reservoir 2. This information must be precise, in particular when the fluid product is a pharmaceutical product and any risk of under-counting must be eliminated. In fact, in the hypothesis of an under-counting, that is when the dose indicating device does not count one or several partial or complete distributions of doses of the product, the user can find him or herself with a distributor indicating to them that there is still one or two doses in the reservoir when in fact the reservoir is empty. In case of a crisis, the user is then in possession of a non-functioning distributor that does not allow them to take their medication reliably.

The present invention permits one to avoid any risk of under-counting. To do this, the dose indicating device comprises at least a security system and preferably two. The first security system is designed to guaranty the activation of the dose indicating device and thus the counting of the dispensing of a dose of the product starting from the moment when during the activation of the distributor a pre-determined partial displacement is achieved. The second security system is designed to prevent during the return displacement of the distributor, the dispensing of a dose as long as the dose indicating device is not ready to count the next dose. In fact, the dosing chamber of the distributor fills in general during the return phase of the distributor to its resting position

after being activated. If this return displacement is not complete and the device is activated again before it reaches its resting position, it is possible that some product will be dispensed. But if the dose indicating device did not return to its resting position or close to it, it cannot count this dose and an under-counting happens then. To avoid this, the second security system blocks any new activation or at least any dispensing of the product. This blocking is applied until the return displacement is sufficient until the dose counting device is ready again to be activated and to count the next dose.

In summary, the present invention provides one or two security systems that eliminate any risk of under-counting by the dose counting device.

In the following we are going to describe the first security system with refernce to figures 1 to 4.

By referring to these figures, one notices that the stationary body 1 comprises a stationary gear 110 and that the dose indicating device comprises a counting element 20 designed to cooperate on one hand with the said stationary gear 110 of the body 1, and on the other with the activating device 30 and/or reservoir 2. In particular, the counting element 20 is movable axially with respect to the body 1 as well as rotationally with respect to the latter. The counting element 20 comprises a first gear 210 designed to cooperate with the said stationary gear 110 of the body and a second gear 230 designed to cooperate with an activating gear 300 attached to the activating device 30.

By referring to figures 1 and 4, they represent the first half of an activation cycle of the distributor, that is, the displacement of the distributor from the resting position (shown in figure 1) to the activation position (shown in figure 4). In this manner, when the user pushes on the activating device 30 to move it axially towards the bottom in figure 1, the oblique profile of the teeth of the activating gear 300 and of the second gear 230 of the counting element forces the counting element 20 towards the bottom and also in rotation due the oblique profile of the teeth of the gears mentioned above. As long as the first gear 210 of the counting element 20 cooperates with the stationary gear 110 of the body any rotation of the counting element 20 is prevented. Consequently, at the beginning of the displacement of the distributor, and thus of the activating device 30, the counting element 20 is uniquely displaced axially together with the activation device 30 without turning. When the system arrives to the position shown on figure 2, the axial

displacement of the counting element 20 has also initiated the axial displacement if the reservoir 2 on a first part of the activation trip. In the position indicated in figure 2, the first gear 210 of the counting element 20 arrives to a position where it no longer cooperates with the stationary gear 110 of the body 1. In this manner, the counting element will turn a little, the dose indicating device is activated and the counting of a dose is initiated. This partial axial displacement of the counting element 20 corresponds to the said activation predetermined partial displacement of the distributor, more particularly of the reservoir 2. In fact, in this type of distributor, the dose of the product is not necessarily dispensed at the end of the activation displacement, but starting from a predetermined partial displacement, which is function of the displacement of the valve or the displacement of the piston in the pump. By matching the cooperation of the first gear 210 of the counting element with the stationary gear 110 of the body 1 with the said predetermined partial activation displacement of the distributor, one assures that if the fluid product risks of being dispensed that this is counted.

Figure 3 shows that the stationary gear 110 of the body 1 comprises stopping means 115, preferably formed by an axial projection cooperating with the first gear 210 of the counting element 20 that impose a new axial displacement of the counting element, weak but non zero, to enable a sufficient engagement of the activating gear 300 in the first landing marked by the stop 235 on the second gear 230. In this manner, the distributor chamber cannot be filled if the stop 215 does not go over. If it goes over, the activating gear 300 will position itself in the second landing at the bottom of the second gear 230 of the counting element 20 before the filling of the distributor chamber in order to block the dispensing of the pharmaceutical product as represented in figure 6.

A pursuit of the activation displacement brings the reservoir 2 in the position represented in figure 4, in which the complete activation displacement is achieved and the totality of the dose is dispensed from the reservoir. One notices however that even if the force applied by the user on the activating device 30 ceases before the end the complete activation displacement, beginning from the time when the partial activation displacement is achieved, the dose indicating device has counted the dispensing of a dose, preventing in this manner any under counting at this level.

In reference to figure 5 to 8, we will describe the second phase of the activating cycle of the distributor, which is the return from the the distribution position to the resting position (shown in figure 8). By reference to figure 5, one notices that when the user relaxes the pressure on the activation device 30, the return spring (not represented) of the distributor brings back the reservoir 2 towards its resting position by axially displacing the reservoir 2 with respect to the body 1 in the reverse direction of the activation displacement described earlier. The displacement of the reservoir 2 causes an axial displacement of the counting element 20 such that the first gear 210 comes to cooperate again with the stationary gear 110 of the body 1 but this time on the oblique parts, which leads to a rotation of the said counting element, to complete the counting cycle of the dose indicating device. When the counting element turns with respect to the body 1 during the return trip, one notices that the activating device 30 starts to cooperate with the bottom of the second gear 230 of the counting element 20, whereas during the activation phase, the activation gear 300 cooperates with the first landing, marked by the stop 235, positioned on the second gear 230 of the counting element 20.

Figure 6 represents schematically, an attempt of a new activation before the end of the return trip of the distributor. One notices that the body 1 comprise axial projections 120 that cooperates with axial projections 220 positioned on the counting element 20. Variably, these axial projections 120 and 220 can be replaced by gears having corresponding shapes. Preferably, the axial end profiles of the said projections 120 and 220 are accomplished by planes and these axial projections 120 and 220 are at least partially positioned opposite each other such that if the return displacement of the distributor is not enough, it would be impossible to dispense a new dose of product as is shown in figure 6. In order to activate the distributor again the counting element 20 must turn sufficiently around its rotation axis so that the said projections 120 and 220 become shifted with respect to each other enabling in this manner a new activation. This shift will be achieved by freeing the activating device 30 from the bottom of the second gear 230 of the counting element 20 in order to position it facing the first landing, marked by the stop 235 of the following tooth. This new activation can be permitted before the end of the complete return trip of the distributor when the dose counting device is again ready to count a new activation of the distributor. The present invention enables the

accomplishment of this requirement as indicated in figure 7 in which the return displacement is not complete but the activating device 30 of the distributor and in particular the activating gear 300 is in a position in which it can cooperate with the next tooth of the second gear 230 of the counting element, such that a new activation at this time causes the rotation of the counting element at the end of its previous cycle, which causes the shifting of the said projection 120 and 220 and authorizes thus a new activation of the distributor and the dose indicating device. The goal is to block the dispensing when the chamber is filled and as long as that the counter is not ready to count the next dose.

In figure 8, the device has returned to its initial resting position and a new activation cycle can be initiated.

Figures 9 to12, represent a second mode of practice of the current invention. This second mode of practice differs from the first mode of practice by the following points. On one hand, the body 1 comprises two stationary gears 110 and 220, and the counting element 20 comprises two gears 21 and 220 each cooperating with the stationary gears of the body. The activating device 30 is attached to the reservoir 2 and the counting element 20 is movable axially with the said activating device 30. It can move rotationally with respect to the said activating device 30. In fact, in this second mode of practice there is not really a true activating device, but the user displaces generally the reservoir 2 themselves with respect to the body 1 in order to obtain activation. The second stationary gear 120 of the body 1 and the second gear 220 of the counting device comprise at least partially oblique parts respectively 121 and 221 that cooperate with each other during the activation of the distributor. These oblique parts force the counting element 20 to move in rotation thus initiating a counting cycle of the dose counting device. As represented in figures 9 and 10 during the activation of the distributor, the counting element is first displaced axially without since it is attached to the activation device 30 and the reservoir 2. When the distributor has achieved the activation predetermined partial trip, the oblique parts 121 and 221 of the second gears 120 and 220 cooperate to turn the activation device as shown in figure 10. It should be noticed that if in the position shown in figure 10, the user stops activating the distributor, the system returns to its resting position due to a return spring 50 and the counting cycle is completed since the first gear

210 of the counting element 20 comes to cooperate with the teeth of the stationary gear 110 to force further the counting element 20 into a rotation in order to bring it to the end of its counting cycle. The first security system is thus accomplished by the fact that the activation of the dose indicating device is assured from the moment when the distributor has accomplished its predetermined partial trip from which a product dose (partial or complete) can be dispensed.

Figure 11 shows the activation position in which the complete activation trip is accomplished and figure 12 illustrates the second security system accomplished by means of the stationary second gear 120 and the second gear 220 of the counting element 20. In fact, these two gears comprise also respectively a plane part, having a plane axial end profile such that when the return displacement of the distributor is not sufficient, as seen in figure 12, a new activation of the system causes an axial stop between the counting element 20 and the second stationary gear 220 by means of their plane end, a thing that prevents the dispensing of the pharmaceutical product by blocking the activation of the distributor. It is only when a predetermined partial return trip is achieved that the oblique parts of the second gears 120 and 220 are opposite each other in order to enable anew activation of the distributor and the dose indicating device.

Figures 13 to 21 show a third mode of practice of the present invention. This third mode of practice differs from the second mode of practice by the fact that the counting element 20 is not attached axially to the activating device 30 of the reservoir. The activating device 30 and the reservoir 2 comprise an activating gear 300 that cooperates with a third gear 230 accomplished on the counting element 20. In this third mode of practice of the invention, the rotation of the counting element 20 during the activating trip of the distributor is no longer caused by the stationary second gear 120 but by the third gear 230 and the activating gear 300. In fact, this third mode of practice combines the first and second modes of practice describe d earlier. At the beginning of the activation, when we are in the situation shown in figure 13, the cooperation between the first stationary gear 110 and the first gear 210 of the counting element 20 prevents a rotation of the counting element 20 and thus causes an axial displacement of the latter. When one gets to the situation represented in figure 14, the first gears mentioned earlier no longer cooperate and the oblique profiles of the teeth of the activation gear 300 and of

the third gear 230 of the counting element 20 cause a rotation of the counting element 20. This is accomplished starting from the said partial activation displacement from which a complete or partial dose of the product can be dispensed. Figure 15 shows that if the axial activation force is suppressed starting from this moment. The counting device, because of the return spring 50, will bring the counting element to make its complete counting cycle avoiding in this manner any risk of under counting.

Figure 16 shows the final activation position in which the total activation displacement was accomplished. At this moment, when the user relaxes the activation force on the activating device 30, the system goes up under the effect of the return spring 50 and the cooperation between the first gears 210 and 110 respectively of the counting element 20 and the body 1 causes the pursuit of the rotation of the counting element. This pursuit of the rotation is blocked in the activating gear 300 by stops 305. In reference to figure 18, if the user pushes again on the activating device 30 in this position, one notices that the activation of the distributor and the counting device is blocked by the fact that the second gear 220 of the counting element and the stationary second gear 120 of the body 1 are opposite each other, at the level of their plane profile of the axial end. Figure 19 illustrates an attempt of activation while the second security system is operational. To enable a new activation of the distributor and of the dose indicating device a predetermined partial return displacement must be accomplished as represented on figure 20. In fact, starting from this position, if the user activates again he/she will cause a rotation of the counting element 20 that will permit a new activation of the distributor and the dose indicating device.

Finally, figure 21 shows the position in which such supplementary attempt of activation is accomplished after the said partial return displacement is achieved.

It is well understood that the detailed description of the three modes of practice of the current invention given above is not limiting and that other variations of the practice are possible without leaving the scope of the invention such as defined by the following claims.

CLAIMS

1- A fluid product distributor, comprising a body (1), a fluid product reservoir (2), a distribution device, such as a pump or a valve, mounted on the said reservoir (2), and a dose indicating device to display the number of dose of product dispensed or left to be dispensed from the said reservoir, characterized by the fact that the said dos indicating device comprises a first security system designed to activate the dose indicating device from a predetermined partial activation displacement, even if the complete activation displacement is not accomplished by the user.

2- A distributor according to claim 1, in which the said dose indicating device comprises a second security system, which during the return displacement of the distributor, after the distribution of a dose, prevents the next dispensing of the product until the said distributor accomplishes a predetermined partial return displacement, the said distributor and said dose indicating device being capable again of being activated starting from this partial return displacement even if the total return displacement is not accomplished by the distributor and that the latter is activated again before returning to its resting position.

3- A distributor according to claim 1 or 2, in which the said reservoir (2) is movable axially with respect to the said body (1), said body (1) comprising at least a stationary gear (110,120), the said dose indicating device comprising a counting element (20)movable axially and in rotation with respect to the body (1), the said counting element (20) cooperating with, on one hand, with at least a stationary gear (110,120) of the said body, and on the other, with the said reservoir (2) when the distributor is activated.

4- A distributor according to claim 3, in which the body (1) comprises a stationary gear (110) cooperating with a first gear (210) of the said counting element (20), the said counting element (20) comprising a second gear (230) cooperating with an activation gear (300) of an activating device (30) of the distributor, the said teeth of the said gear (230) and/or of the said activation gear (300) being made such that an axial displacement of the activation device causes the said counting device (20) to move axially and in

rotation and the stationary gear (110) preventing the rotation of the said counting element (20) until the said counting element (20) no longer cooperates with the said stationary gear (110) after a predetermined axial displacement of the said counting element (20) corresponding to the said predetermined partial activation displacement of the distributor.

5- A distributor according to claim 4 in which the stationary gear (110) comprises stopping mechanisms (115) that block the rotation of the said counting element (20) after at least a partial rotation of the said counting element (20), a supplemental axial displacement of the said counting devoice (20) being necessary in order to enable the pursuit of its rotation and/or the return of the dose indicating device towards its resting position.

6- A distributor according to claim 5, in which the stopping means (115) comprise an axial projection.

7- A distributor according to any of the above claims 3 to 6, in which the said stationary gear (110) and/or the said counting element (20) comprises blocking means (120, 220) preventing a new activation of the distributor and thus new dispensing of the pharmaceutical product, when the counting element (20) returns towards its resting position after a previous activation until the distributor achieves a predetermined partial displacement from which the said dose indicating device can count the next dose.

8- A distributor according to claim 7, in which the said stopping means comprise axial projections (120, 220) designed respectively on the body (1) and on the counting element (20), said projections (120, 220) comprising each a plane end profile, said projections (120,220) being at least partially facing each other until the counting element (20) has achieved a rotation sufficient to shift the said projection (120,220) corresponding to the said predetermined partial displacement of the distributor.

9- A distributor according to claim 8, in which the teeth of the second gear (230) of the counting element (20) comprise an intermediate plane (235), the activating element (30)

cooperating with the said plane (235) during the activation of the distributor, and cooperating with the bottom of the said second gear (230) during the return towards the resting position, after an activation, the displacement between the intermediate plane (235) and the bottom being obtained by rotation of the said counting element (20).

10- A distributor according to claim 8 or 9, in which, when the predetermined partial return displacement is accomplished, the activating device (30) is paced facing the next tooth of the second gear (230) of the counting element (20), enabling a new activationof the distributor and of the dose indicating device.

11- A distributor according to claim 3, in which the body (1) comprises a first stationary gear (110) and a second stationary gear (120), the said counting element (20) comprising a first gear (210) designed to cooperate with the said stationary gear (110) and a second gear (220) designed to cooperate with the said stationary gear (120), the said counting element (20) being axially brought in contact with the activating device (30) of the distributor by means of a return spring (50) and being rotationally movable with respect to activating device (30), the teeth of the said second gear (220) and second stationary gear (120) being at least partially oblique such that an axial displacement of the activating element (30) causes first the said counting element (20) to travel axially on a predetermined partial activation displacement until the oblique part (221) of the said second gear (220) of the counting element (20) cooperates with the said oblique part (121) of the said stationary gear (120) causing the counting element (20) to travel rotationally on a first part of the rotation cycle, the teeth of the said first gear (210) and first stationary gear (110) being at least partially oblique such that when the counting element (20) returns to its resting position, it is forced to rotate to finish its rotation cycle corresponding to the counting of an activation of the distributor.

12- A distributor according to claim 11, in which the said first and second stationary gears (110,120) of the body (1) and/or the said first and second gears (210, 220) of the counting element (20) are shifted with respect to each other such that just when the counting element (20) travels in rotation, a return of the latter towards its rest position

without finishing the activating displacement of the distributor leads the rotation of the counting element in its complete rotation cycle, Guaranteeing the counting of the activation of the distributor after the said predetermined partial activation displacement.

13- A distributor according to any of the claims 11 or 12 in which the said second stationary gear (120) of the body (1) and/or the second gear (220) of the counting element (20) comprise stopping means that prevent a new activation of the distributor and thus a new dispensing of the pharmaceutical product, when the counting element returns to its rest position after a previous activation until the said distributor achieves a predetermined partial return displacement from which the dose indicating device can count the next dose.

14- A distributor according to claim 13, in which the said stopping means comprise a profile of the axial end at least partially plane designed on the teeth of the said second stationary gear (120) of the body (1) and of the said second gear (220) of the counting element (20), said plane profiles of the said teeth being at least partially opposite each other until the counting element (20) has accomplished a rotation sufficient to shift the said teeth, corresponding to the said predetermined partial displacement of the distributor.

15- A distributor according to any of the claims 11 to 14, in which the said activating device (30) of the distributor is attached to the said reservoir (2) and travels axially with it.

16- A distributor according to claim 3, in which the body (1) comprises a first stationary gear (110) and a second stationary gear (120), the said counting element (20) comprising a first gear (210) designed to cooperate with the said first stationary gear (110), a second gear (220) designed to cooperate with the second stationary gear (120), and a third gear (230) designed to cooperate with an activation gear (300) attached to an activation device (30) of the distributor, the teeth of the said third gear (230) and/or of the said activating gear (300) being made such that an axial displacement of the activating device (30) causes the said counting element (20) to travel axially in rotation, the first stationary gear

(110) preventing a rotation of the said counting element (20) until the said counting element no longer cooperates with the said first stationary gear (110) after a predetermined partial displacement of the said counting element (20) corresponding to the said predetermined partial activating displacement of the distributor.

17- A distributor according to claim 16 in which the second stationary gear (120) of the body (1) and/or the second gear (220) of the counting element (20) comprise(s) blocking mechanisms preventing a new activation of the distributor and thus a new dispensing of the pharmaceutical product when the counting element (20) returns to its rest position after a previous activation until the said distributor achieves a predetermined partial return displacement from which the dose counting device can count the next dose.

18- A distributor according to claim 17, in which the said blocking means comprise a plane profile of the axial end designed on the teeth of the second stationary gear (120) and of the said second gear (220), said teeth being at least partially facing each other until the counting element (20) has accomplished a rotation sufficient to shift the sad teeth corresponding to predetermined partial return displacement of the distributor.

19- A distributor according to claim 17 or 18 in which the activating gear (300) comprises stops (305) limiting the rotation of the counting element (20) until the activating device (30) has achieved the said predetermined partial return displacement of the distributor.

20- A distributor according to claim 19, in which the said stops (305) comprise an axial projection designed on the said activating gear (300).

21- A distributor according to any of the claims 16 to 20, in which the activating device (30) of the distributor is attached to the said reservoir (2) and travels axially with it.

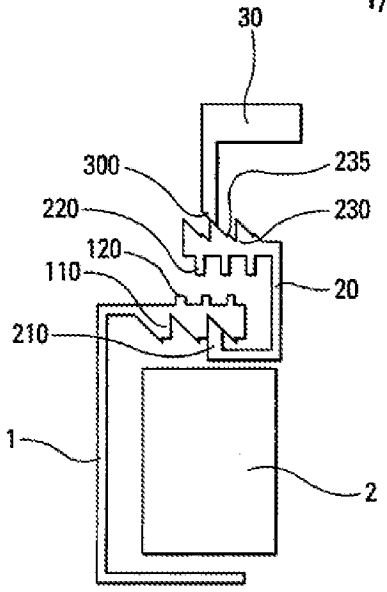


Fig. 1

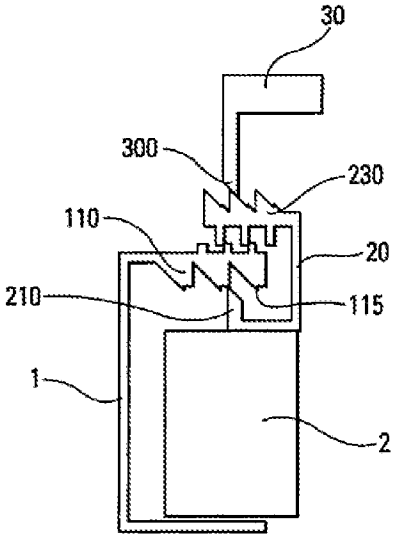


Fig. 2

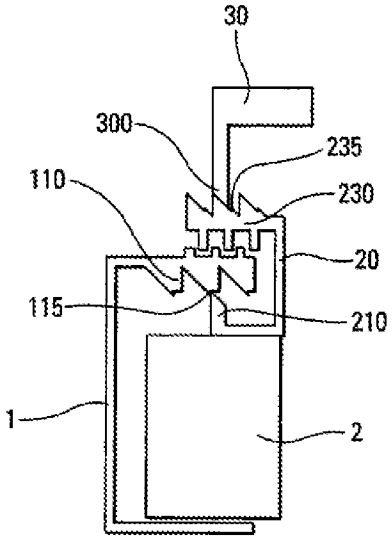


Fig. 3

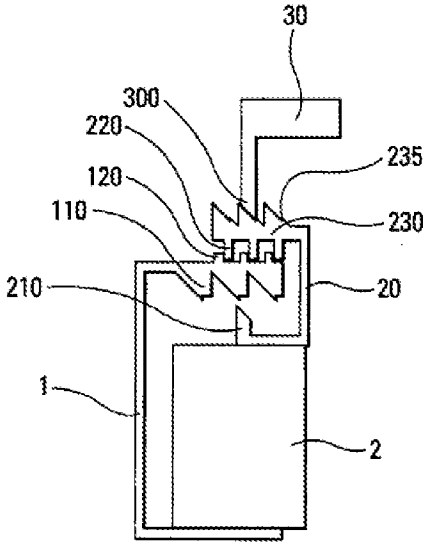


Fig. 4

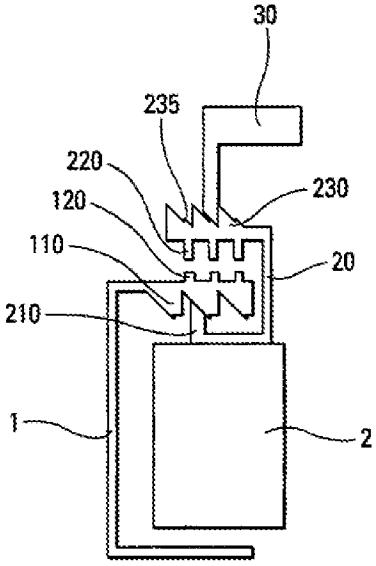


Fig. 5

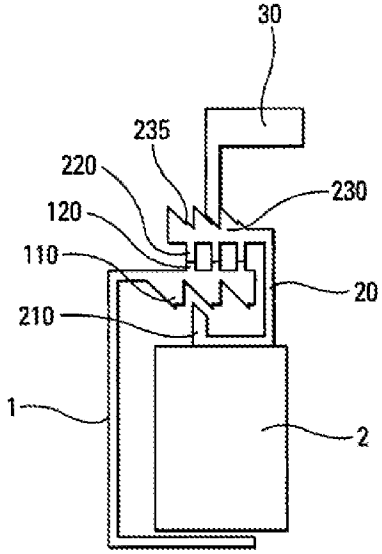


Fig. 6

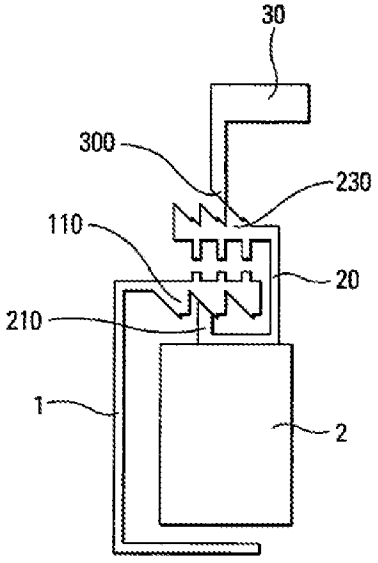


Fig. 7

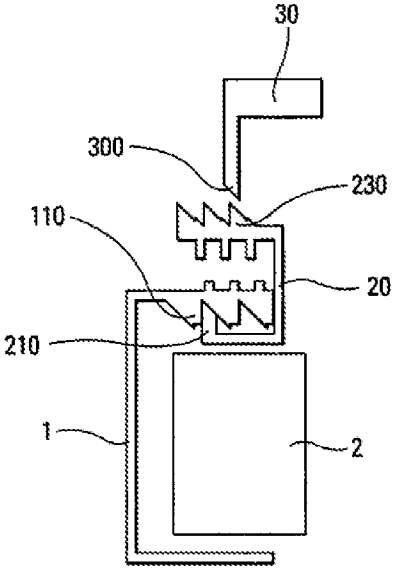


Fig. 8

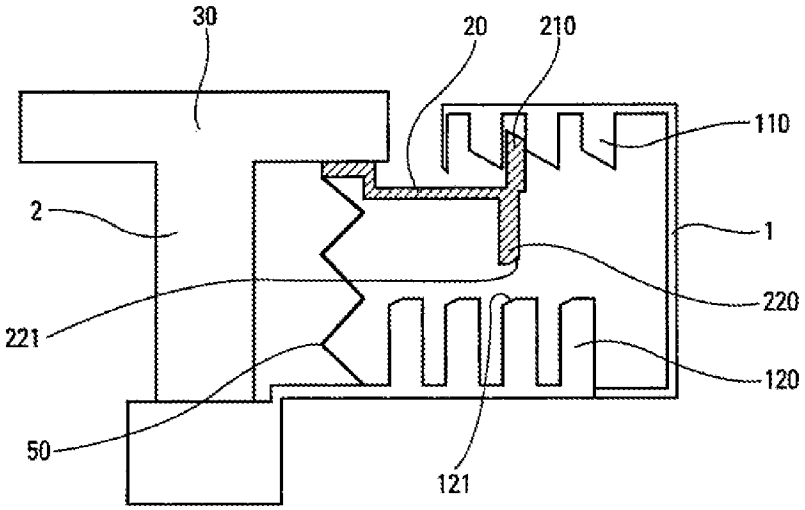


Fig. 9

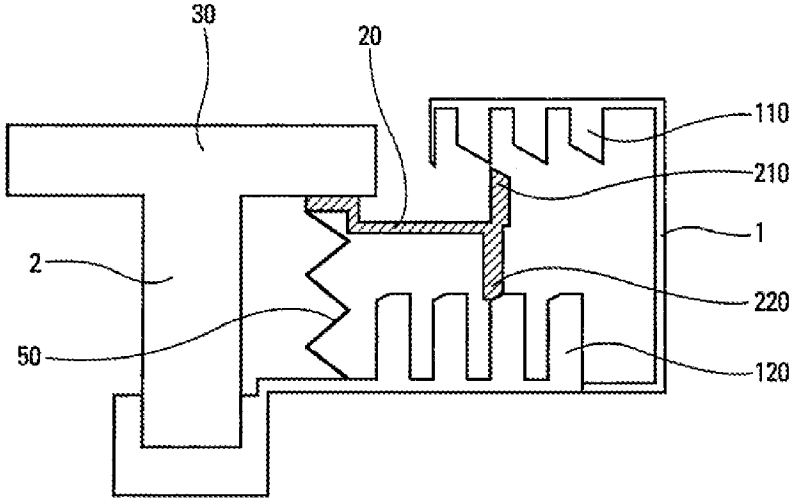


Fig. 10

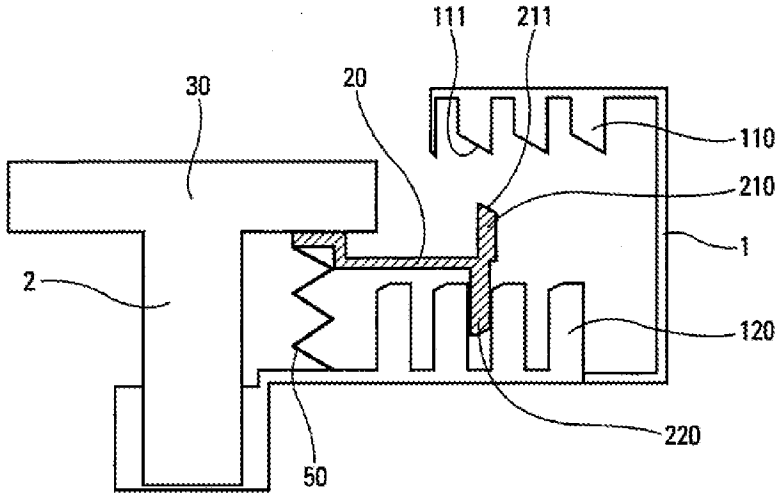


Fig. 1

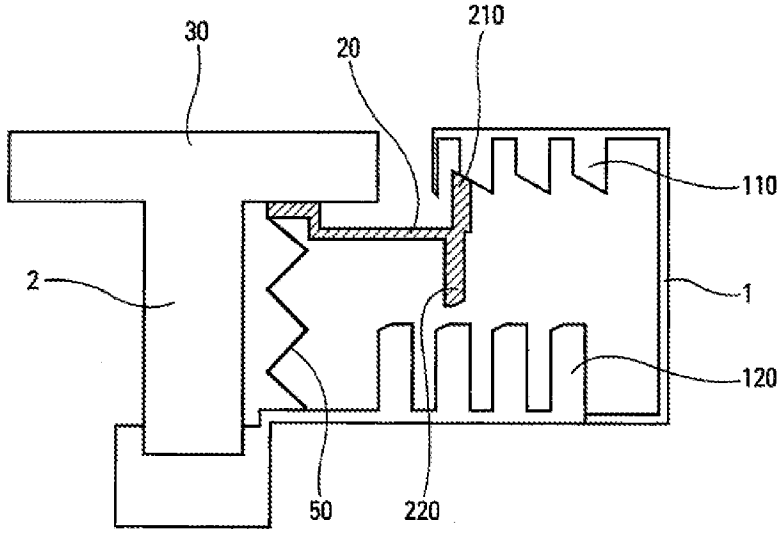


Fig. 1

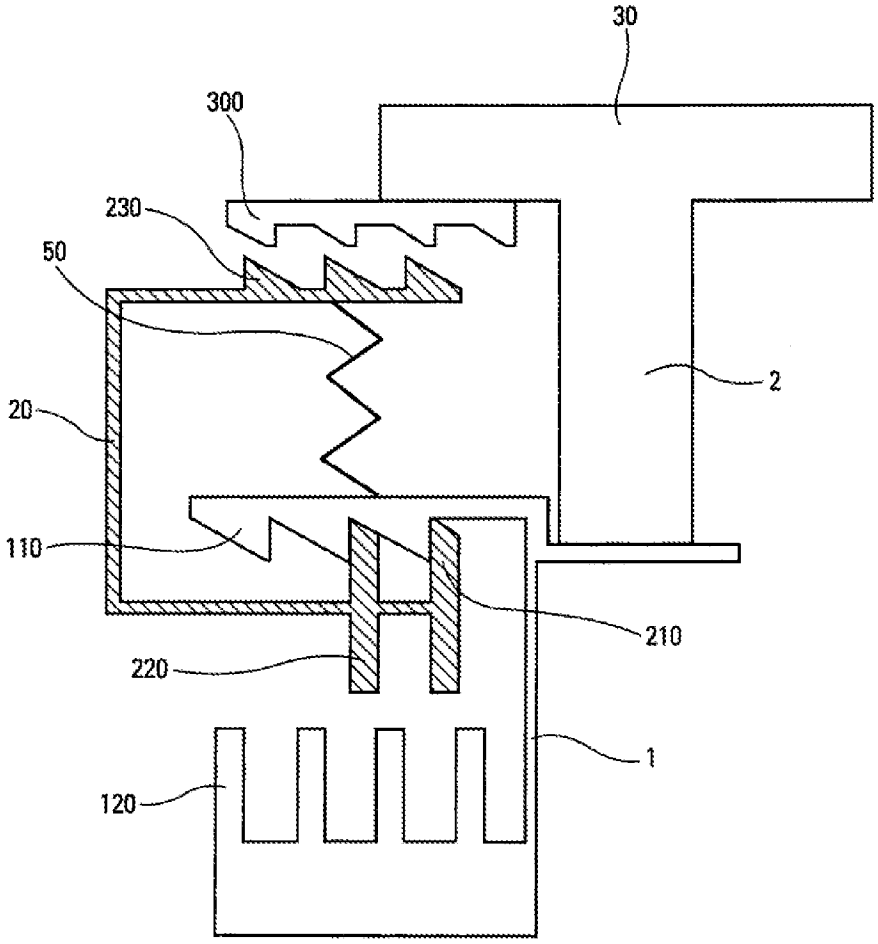


Fig. 13

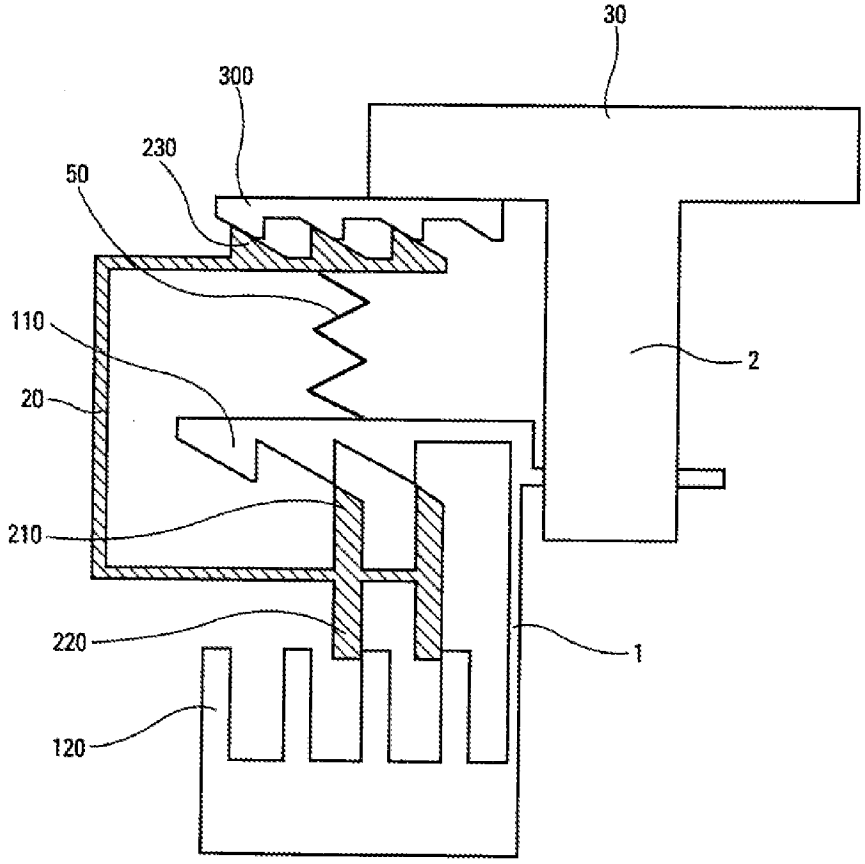


Fig. 14

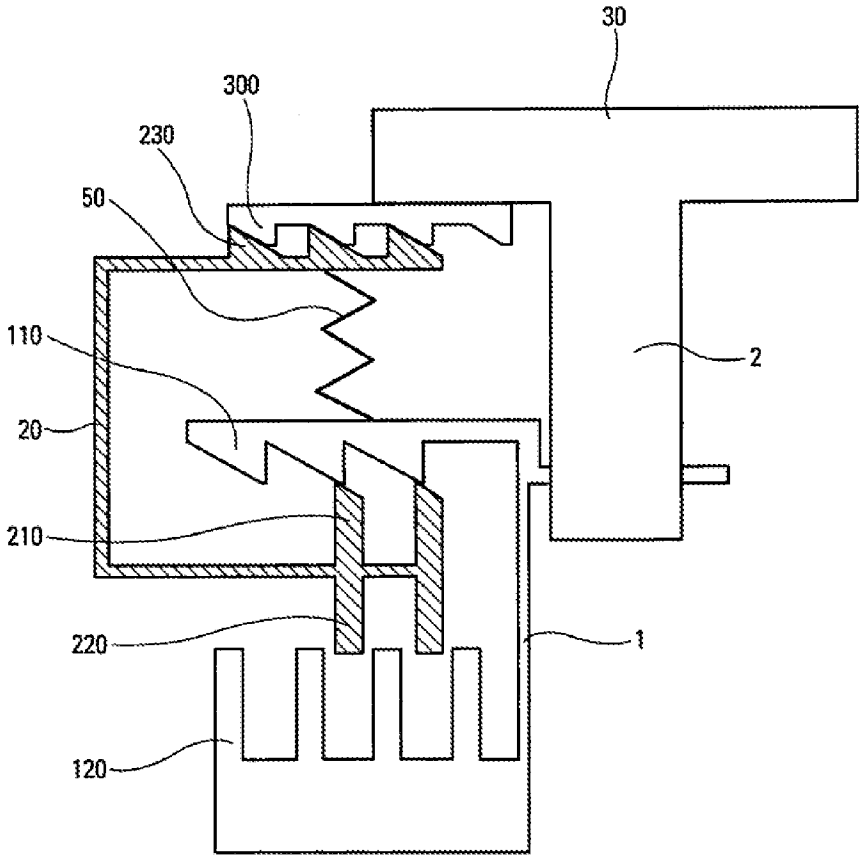


Fig. 15

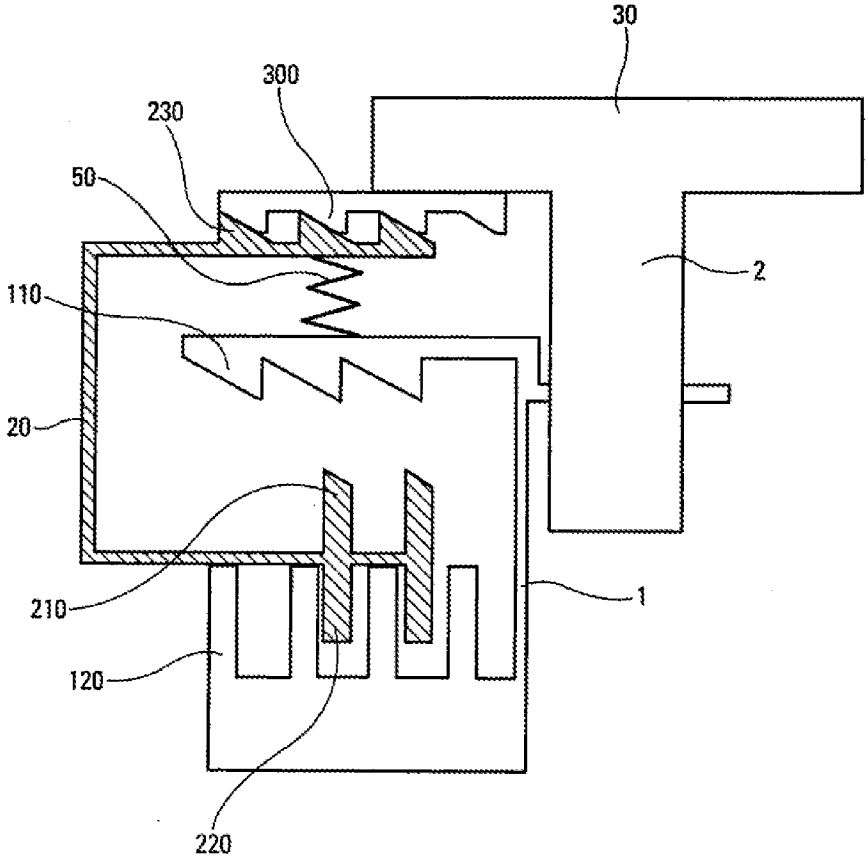


Fig. 16

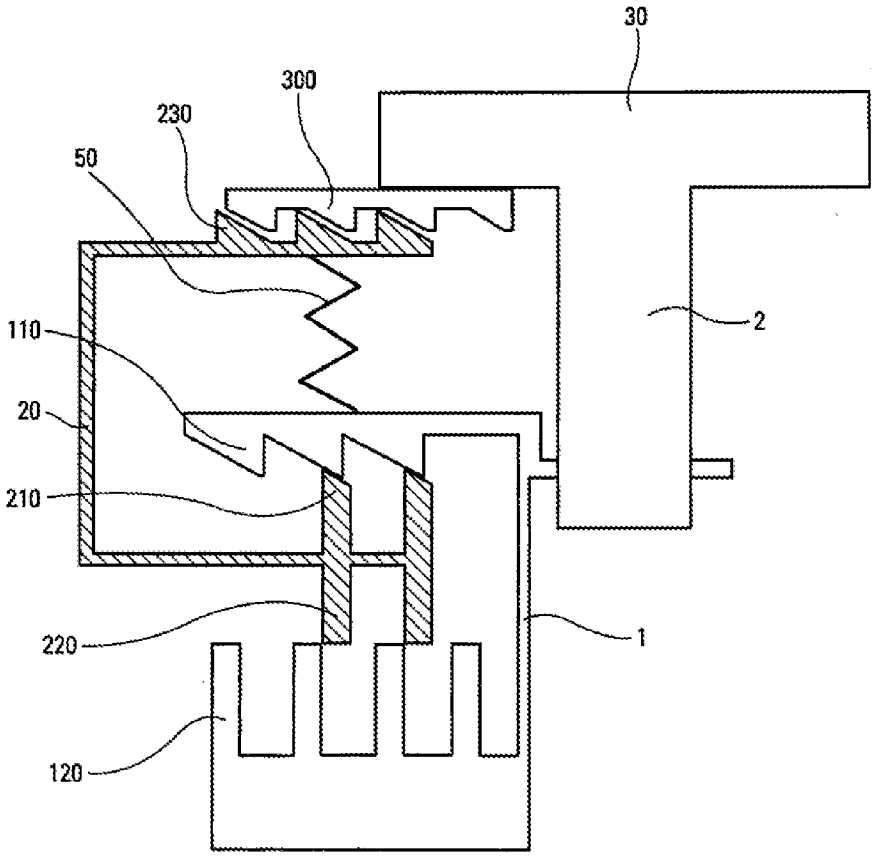


Fig. 17

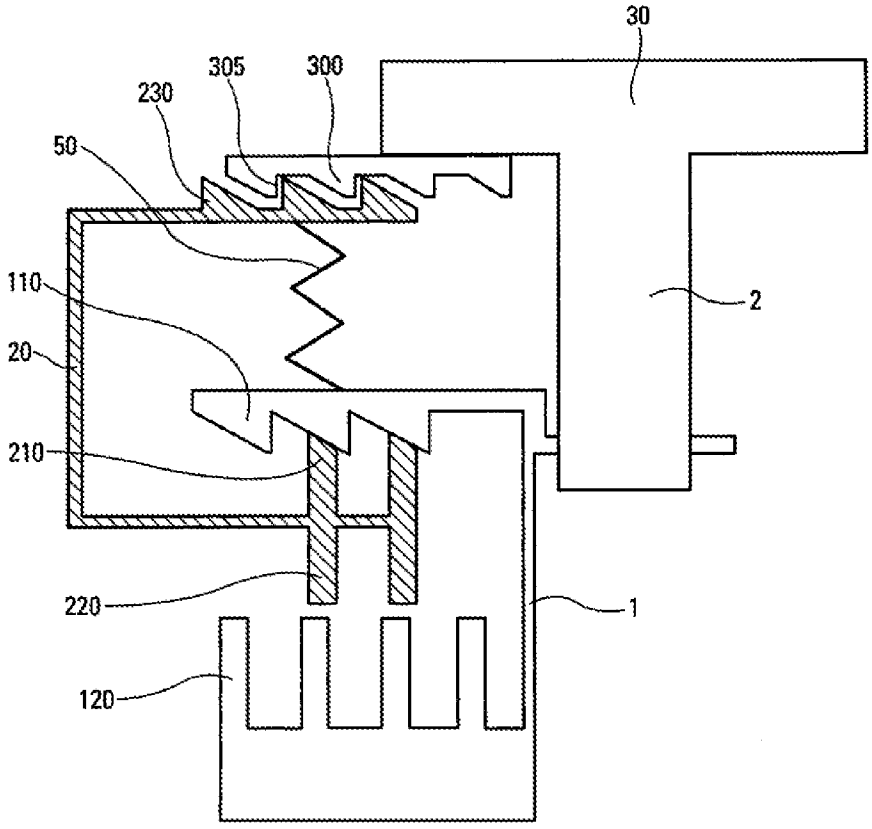


Fig. 18

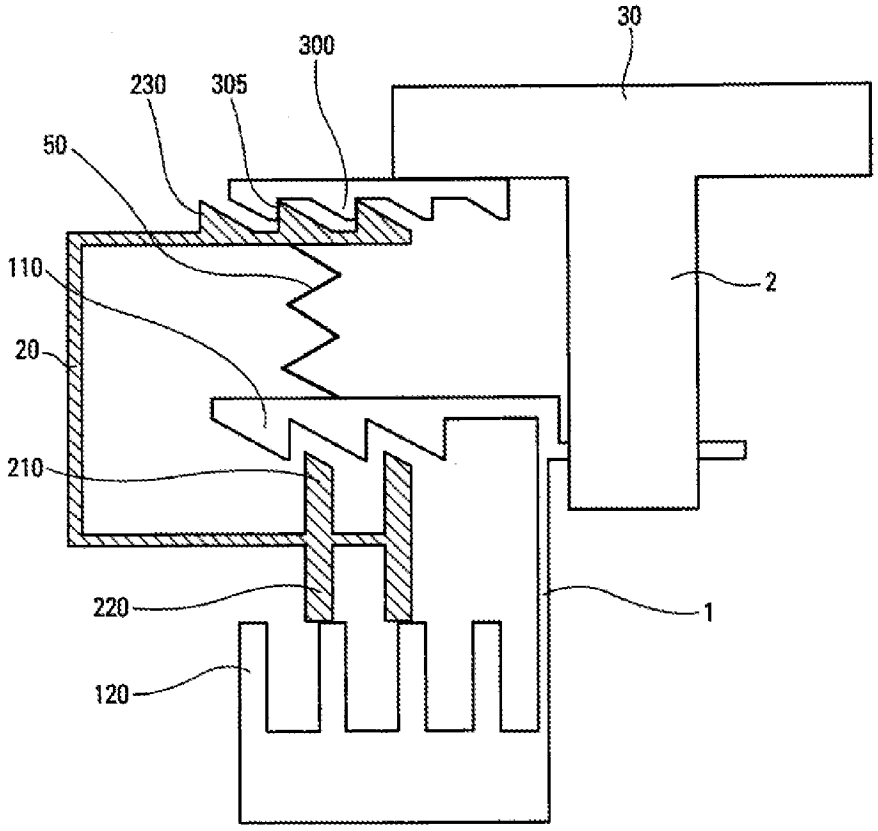


Fig. 19

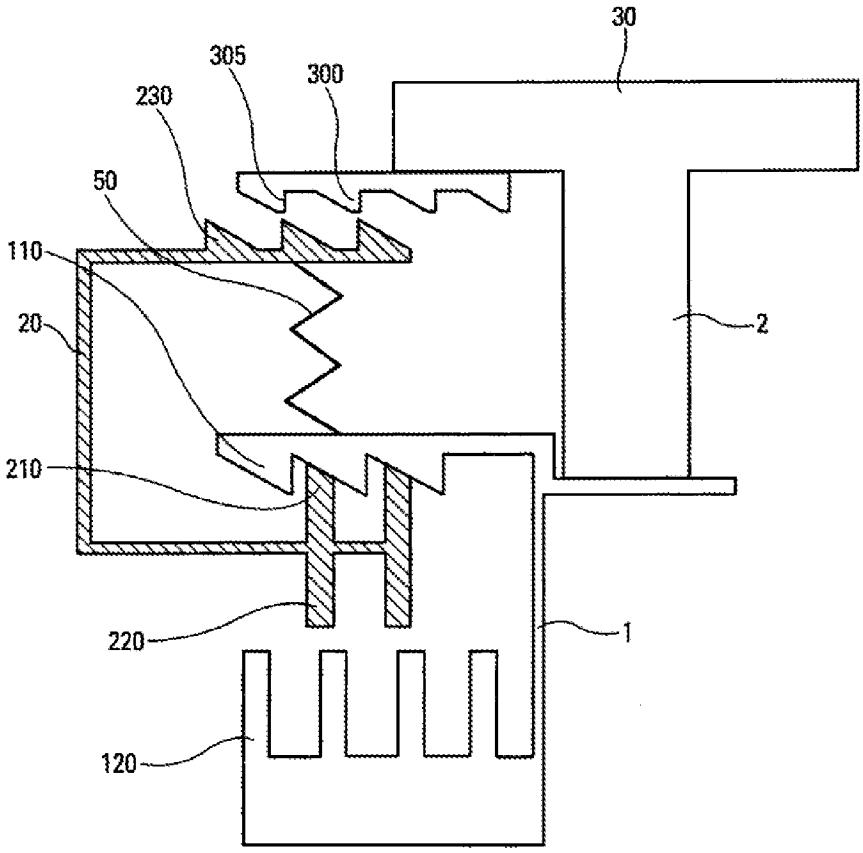


Fig. 20

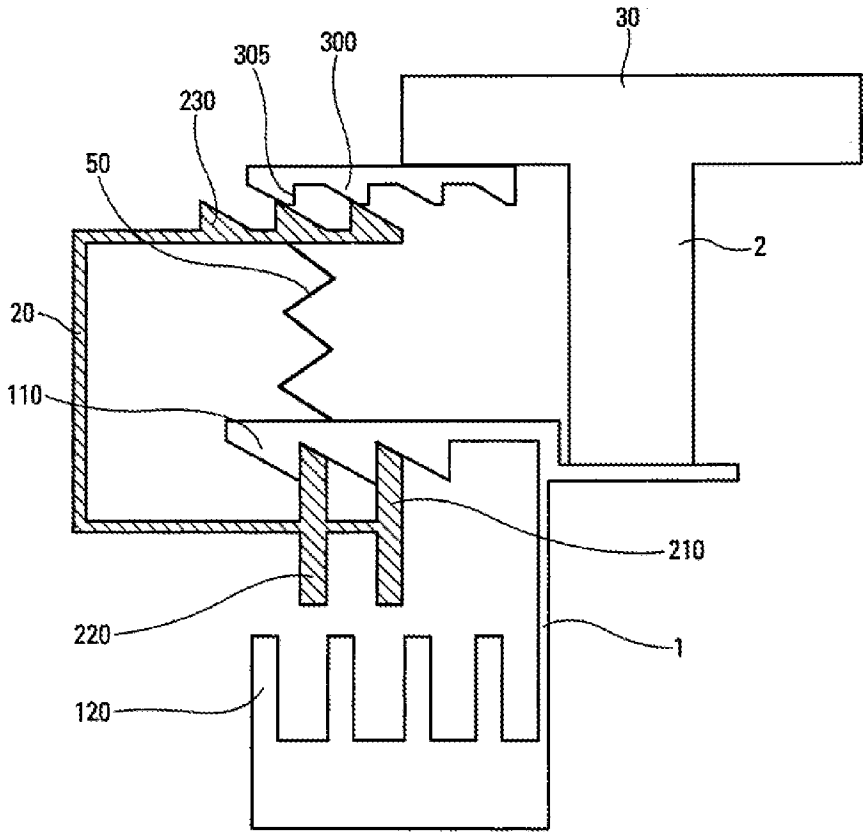


Fig. 21

French Republic

INPI (National Institute of Industrial Property)

Preliminary Research Report : Established on the basis of the last claims delivered before the start of the search)

National Registration Number: FA 634520, FR 0305858

Pertinent Documents		Pertinent Claims	Classification attributed to the invention by the INPI
Category	Citation of the document with indication, if necessary, of pertinent parts		
X A	US 2002/195102 A1(Godfrey James William et Al) December 26 2002 *indent [0019],[0042],[0043],[0046],[0049] [0050] Figures 1-4*	1,3 2	B65D83/76 B65D47/34 B65D83/54 A61/M11/00 B05B11/06
X	US 6 446 627 B1 (Panay Costatinos Et Al) September 10 2002 Column 9, line 26-36, Figures 1-3,5	1	
X	DE 100 61 723 A (Eckert Rosemarie) July 11 2002 Indent [0056] Figures 3-15	1	
A	EP 0 480 488 A (Elettro Plastica SPA) April 15 19912 Entire document		
	Search Completion Date: January 29 2004	Examiner Balz O.	Technical Domain searched : A61M
X : pertinent in itself A: Technical background			

Annex to the Preliminary Research Report relative to the Patent French Application Number FR 0305858 FA 634520

The present annex indicates the Patent family members cited in the Preliminary research Report cited below
The said members are contained in the electronic file of the European Office of patents dated 01-29-2004
The information provided is given for example only and does not commit The European office of Patents neither the French Administration.

Patent Cited	Pub. Date Day-month-yaer	Patent family	Pub. Date day-month-year
US 2002195102 A1	26-12-2002	US 2003209239 A1	13-11-2003
		AU 741218 B2	29-11-2001
		AU 8213898 A	30-12-1998
		BR 9809983 A	01-08-2000
		EP 0988078 A1	29-03-2000
		JP 2000513634 T	17-10-2000
		US 6474331 B1	05-11-2002
		AP 1126 A	05-12-2002
		AT 251481 T	15-10-2003
		AT 215389 T	15-04-2002
		AU 741693 B2	06-12-2001
		AU 8213798 A	30-12-1998
		AU 742913 B2	17-01-2002
		AU 8436498 A	30-12-1998
		BR 9809554 A	20-06-2000
		BR 9809980 A	01-08-2000
		CN 1265601 T	06-09-2000
		DE 69804609 D1	08-05-2002
		DE 69804609 T2	12-09-2002
		DE 69818819 D1	13-11-2003
		DK 988077 T3	12-01-2004
		DK 986412 T3	22-07-2002
		EA 1396 B1	26-02-2001
		EG 21520 A	28-11-2001
		WO 9856444 A1	17-12-1998
		WO 9856445 A1	17-12-1998
		WO 9856446 A1	17-12-1998
		EP 1163922 A2	19-12-2001
		EP 0988077 A1	29-03-2000
		EP 0986412 A1	22-03-2000
		ES 2175737 T3	16-11-2002
		HK 1023956 A1	27-09-2002
		HR 980304 A1	30-04-1999
		HU 0003328 A2	28-02-2001
		ID 24128 A	06-07-2000
		JP 2000513632 T	17-10-2000
		JP 2000513633 T	17-10-2000
		NO 996085 A	09-02-2000
		NZ 501379 A	26-04-2002
		PL 337316 A1	14-08-2000
		PT 986412 T	30-09-2002
		TR 9903066 T2	21-07-2000
		TW 533865 Y	21-05-2003
		US 6360739 B1	26-03-2002
		US 6431168 B1	13-08-2002
		ZA 9804944 A	08-12-1999

EPO FORM P0458

US 6446627	B1	10-09-2002	GB	2320489	A	24-06-1998
			AU	5329298	A	17-07-1998
			EP	0966309	A2	29-12-1999
			WO	9828033	A2	02-07-1998
DE 10061723	A	11-07-2002	DE	10061723	A1	11-07-2002
EP 0480488	A	15-04-1992	IT	1243820	B	28-06-1994
			AT	113486	T	15-11-1994
			AU	646873	B2	10-03-1994
			AU	8025891	A	16-04-1992
			BR	9103035	A	16-06-1992
			CA	2046806	A1	10-04-1992
			DE	69104950	D1	08-12-1994
			DE	69104950	T2	09-03-1995
			EP	0480488	A1	15-04-1992
			ES	2066336	T3	01-03-1995
			JP	3211894	B2	25-09-2001
			JP	5228213	A	07-09-1993
			US	5174473	A	29-12-1992